

# Investigating Trigonometric Functions

The Reciprocal Functions

[TrigFunc.gsp]

Name \_\_\_\_\_



I. Click on the section titled “Cosecant Function” (or click the tab at the bottom of the screen. Answer the following questions:

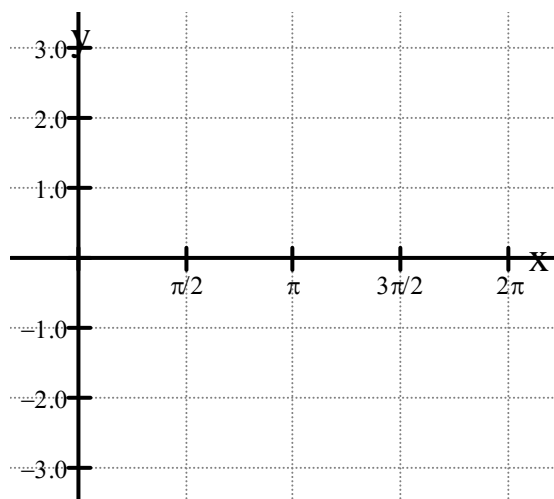
1. What is the range of  $f(x) = \csc(x)$  ? \_\_\_\_\_

2. Fill in the box with the appropriate trig. function:  $\csc(x) = \frac{1}{\boxed{\phantom{000}}}$

3. Click on “Show  $\sin(x)$ ”.

4. On the  $x$ -interval 0 to 3, at what point are the functions  $f(x) = \sin(x)$  and  $g(x) = \csc(x)$  tangent to one another? \_\_\_\_\_

5. On the  $x$ -interval -5 to 5, how many times is  $f(x) = \csc(x)$  asymptotic? \_\_\_\_\_  
Approximate the decimal locations of the asymptotes \_\_\_\_\_



6. Using the grid at the left, graph  $g(x) = \csc(x)$  and  $f(x) = \sin(x)$ . Label the functions.

Be careful that your  $x$ -values in full decimal form from Sketchpad and the  $x$ -values in radian notation on the graph grid represent the same values.



II. Click on the section titled “Secant Function” (or click the tab at the bottom of the screen. Answer the following questions:

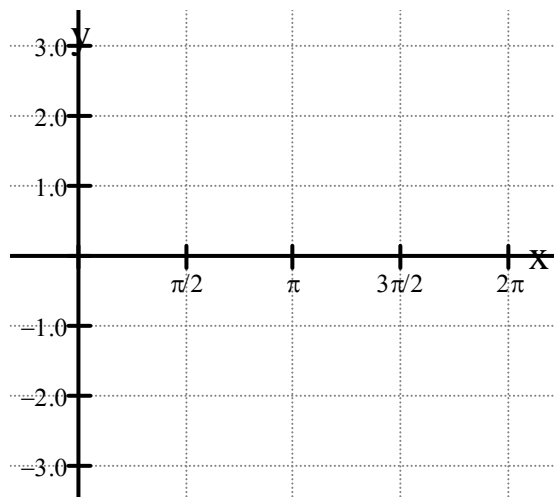
1. What is the range of  $f(x) = \sec(x)$  ? \_\_\_\_\_

2. Fill in the box with the appropriate trig. function:  $\sec(x) = \frac{1}{\boxed{\phantom{000}}}$

3. Click on “Show  $\cos(x)$ ”.

4. On the  $x$ -interval -1 to 4, at what points are the functions  $f(x) = \cos(x)$  and  $g(x) = \sec(x)$  tangent to one another? \_\_\_\_\_

5. On the  $x$ -interval -6 to 3, how many times is  $f(x) = \sec(x)$  asymptotic? \_\_\_\_\_  
Approximate the decimal locations of the asymptotes \_\_\_\_\_



6. Using the grid at the left, graph  $g(x) = \sec(x)$  and  $f(x) = \cos(x)$ . Label the functions.

Be careful that your  $x$ -values in full decimal form from Sketchpad and the  $x$ -values in radian notation on the graph grid represent the same values.



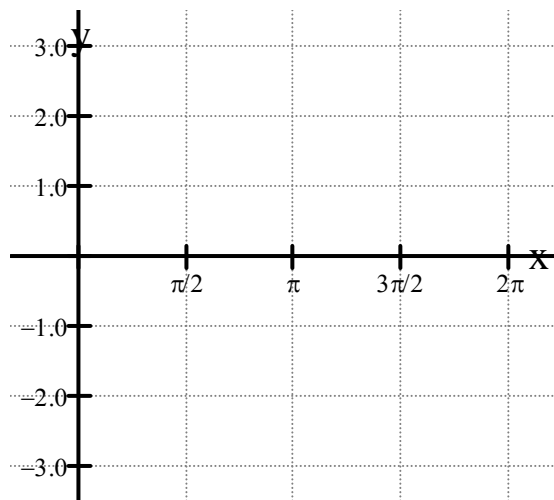
**III.** Click on the section titled “**Cotangent Function**” (or click the tab at the bottom of the screen. Answer the following questions:

1. On the closed  $x$ -interval from 0 to 3, how many times is  $f(x) = \cot(x)$  asymptotic ? \_\_\_\_\_  
Approximate the decimal locations of the asymptotes \_\_\_\_\_

2. Fill in the box with the appropriate trig. function:  $\cot(x) = \frac{1}{\boxed{\phantom{000}}}$

3. Click on “*Show tan(x)*”.

4. On the  $x$ -interval 0 to 2, at what approximate decimal location is the function  $f(x) = \tan(x)$  equal to the function  $g(x) = \cot(x)$  ? \_\_\_\_\_  
Approximately, what would this value be in radian notation? \_\_\_\_\_



5. Using the grid at the left, graph  $g(x) = \cot(x)$  and  $f(x) = \tan(x)$ . Label the functions.

Be careful that your  $x$ -values in full decimal form from Sketchpad and the  $x$ -values in radian notation on the graph grid represent the same values.